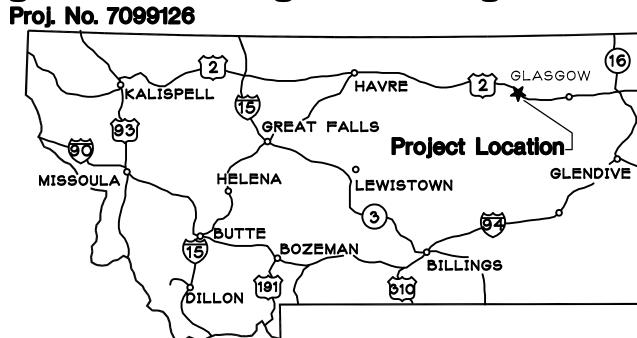


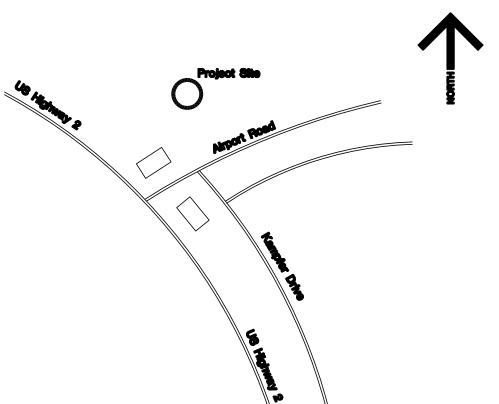


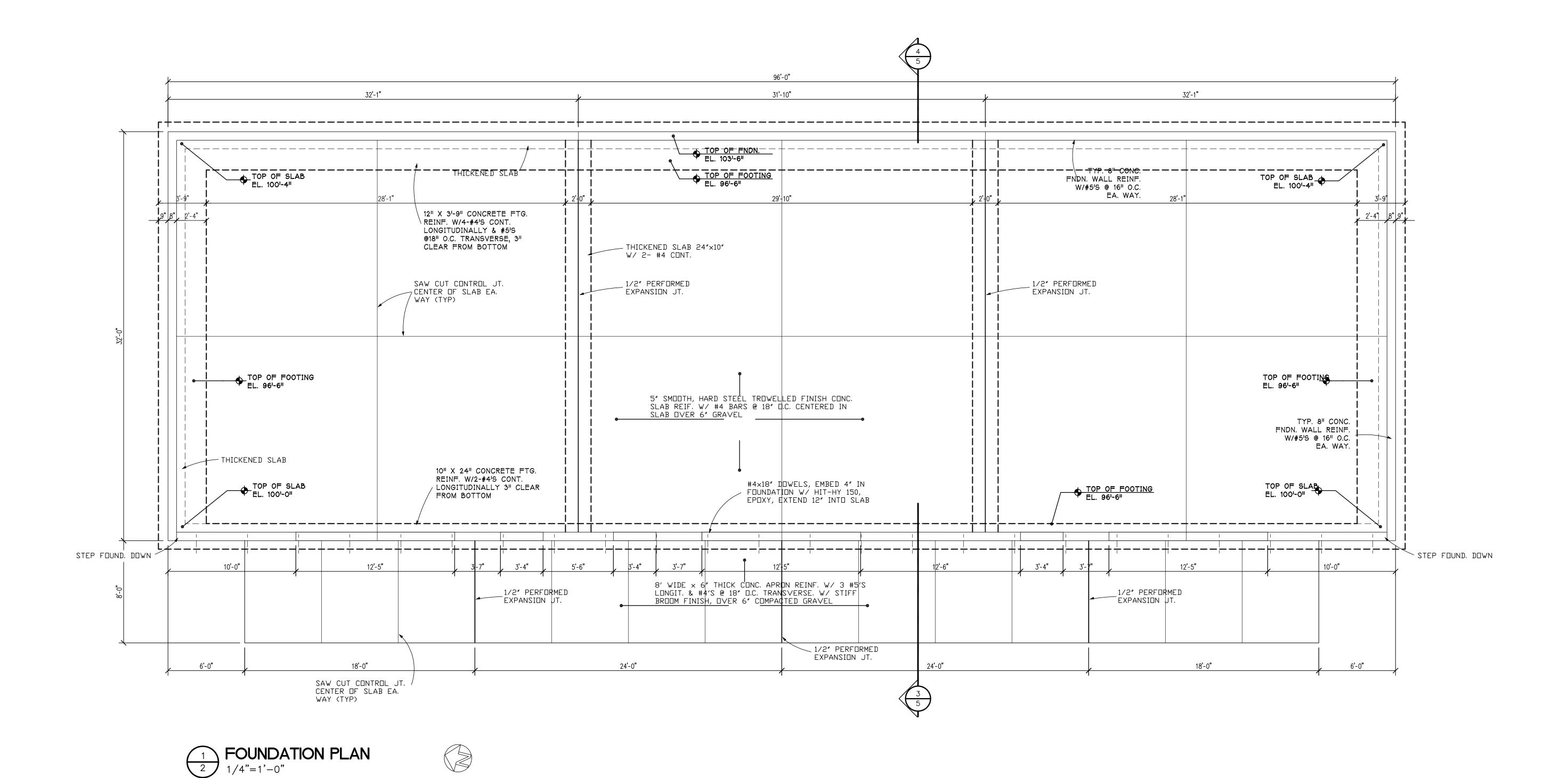
- A-1 Title Sheet, Index, Site Plan
- A-2 Foundation Plan, Details
- A-3 Floor Plan, Schedules
- A-4 Exterior Elevations
- A-5 Exterior Elevation, Sections
- A-6 Roof Framing Plan, Details
- Specifications
- **Electrical Cover Sheet**
- E-3 Electrical Plan
- E-4 Electrical Specifications

Region 6 Storage Building FWP Proj. No. 7099126



Vicinity Map Glasgow, Montana



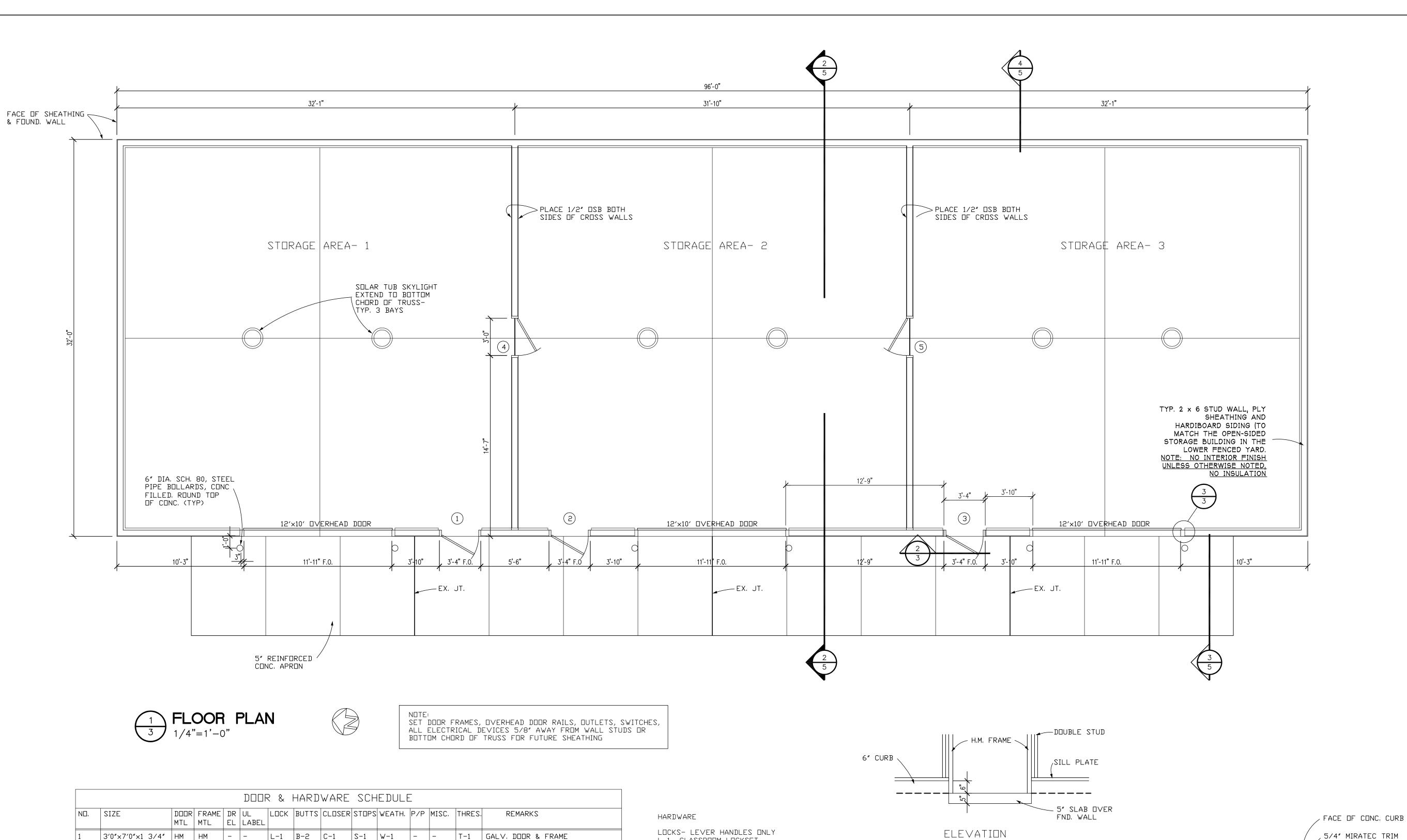


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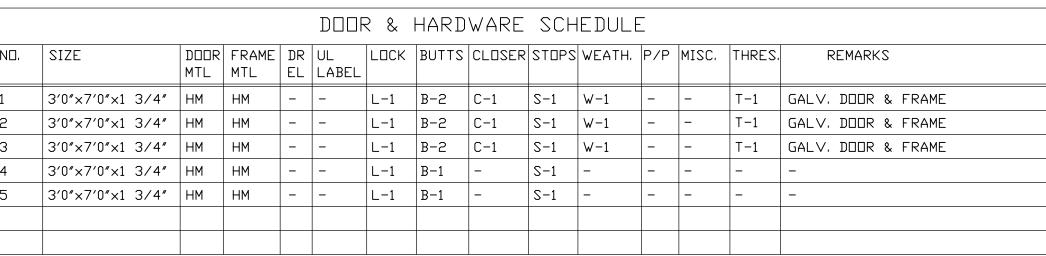
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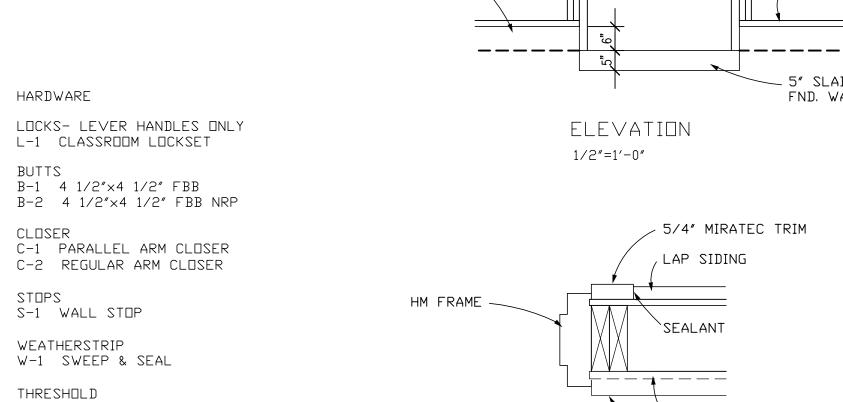


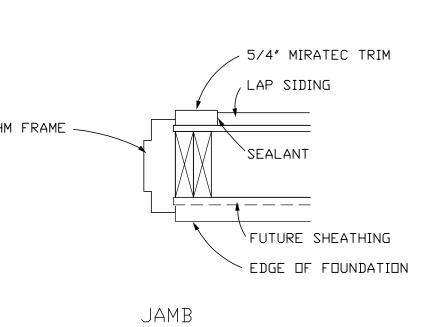
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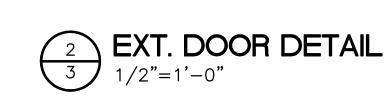
T-1 6″× 1/4″ HIGH



FINISH SCHEDULE									
NAME	FLOOR	BASE	NORTH	EAST	SOUTH	WEST	CEILING	НТ	REMARKS
STORAGE- 1	CONC	_	EXPOSED STUDS	EXPOSED STUDS	1/2″ OSB	EXPOSED STUDS	TRUSS	13′0″	SEAL CONC. FLOORS
STORAGE- 2	CONC	_	1/2″ OSB	EXPOSED STUDS	1/2″ OSB	EXPOSED STUDS	TRUSS	13′0″	SEAL CONC FLOORS
STORAGE- 3	CONC	_	1/2″ OSB	EXPOSED STUDS	EXPOSED STUDS	EXPOSED STUDS	TRUSS	13′0″	SEAL CONC FLOORS







1 1/2"=1'-0"



CONC. OPENING

12'-0" DOOR

20 GA. PRE-FIN. ALUM. CLOSURE

TREATED 2x8 <

LAP SIDING

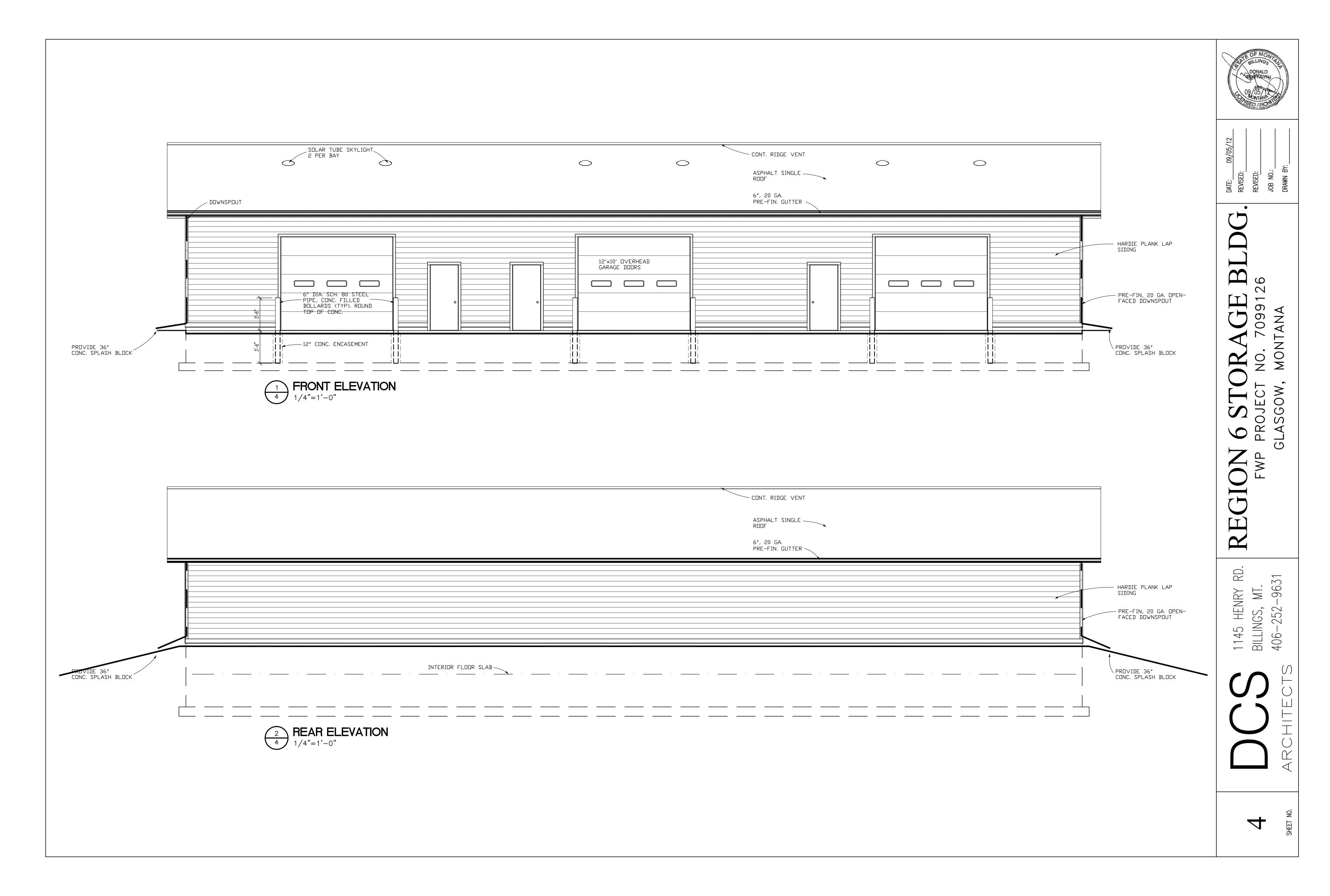
EDGE OF FOUNDATION

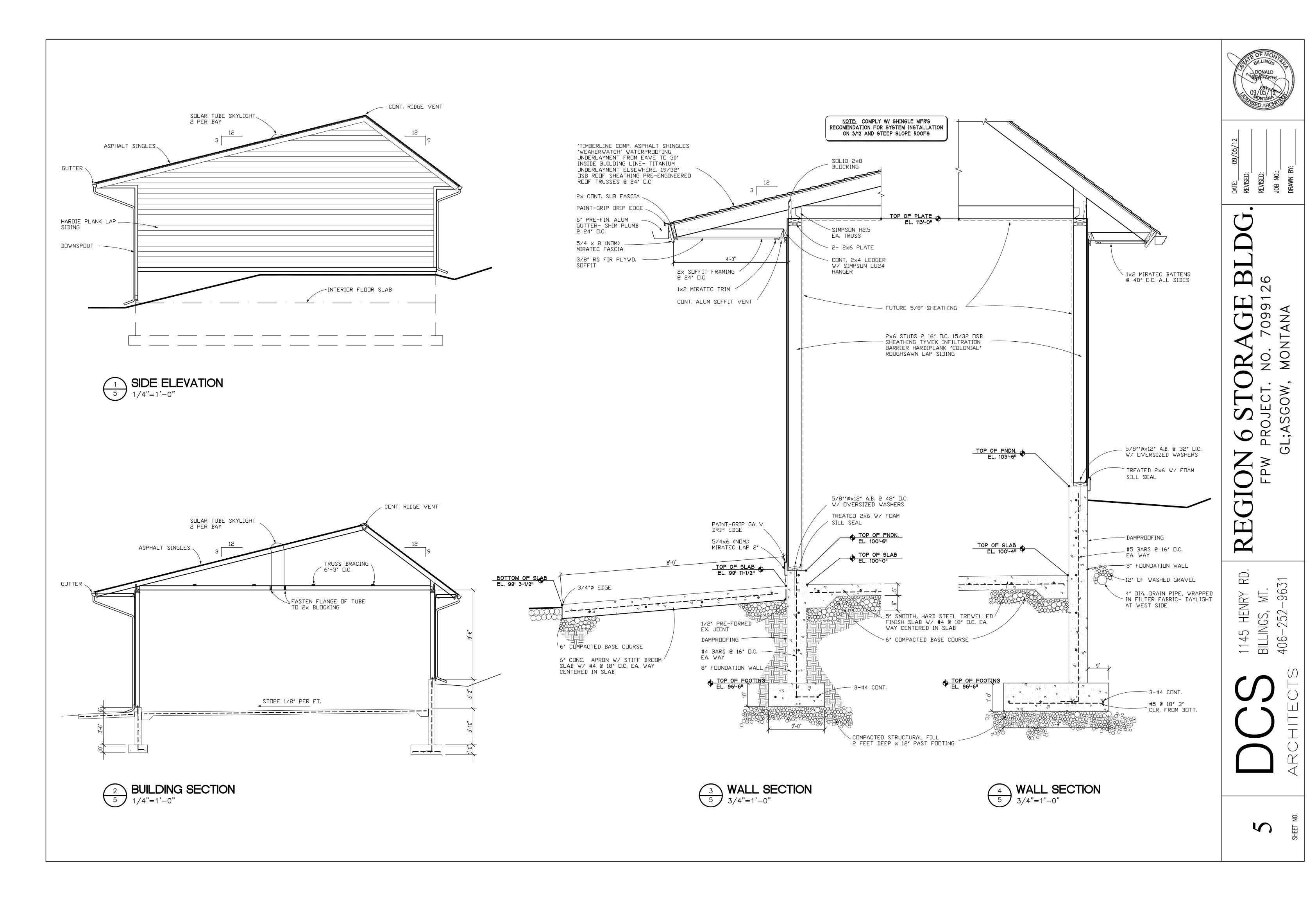


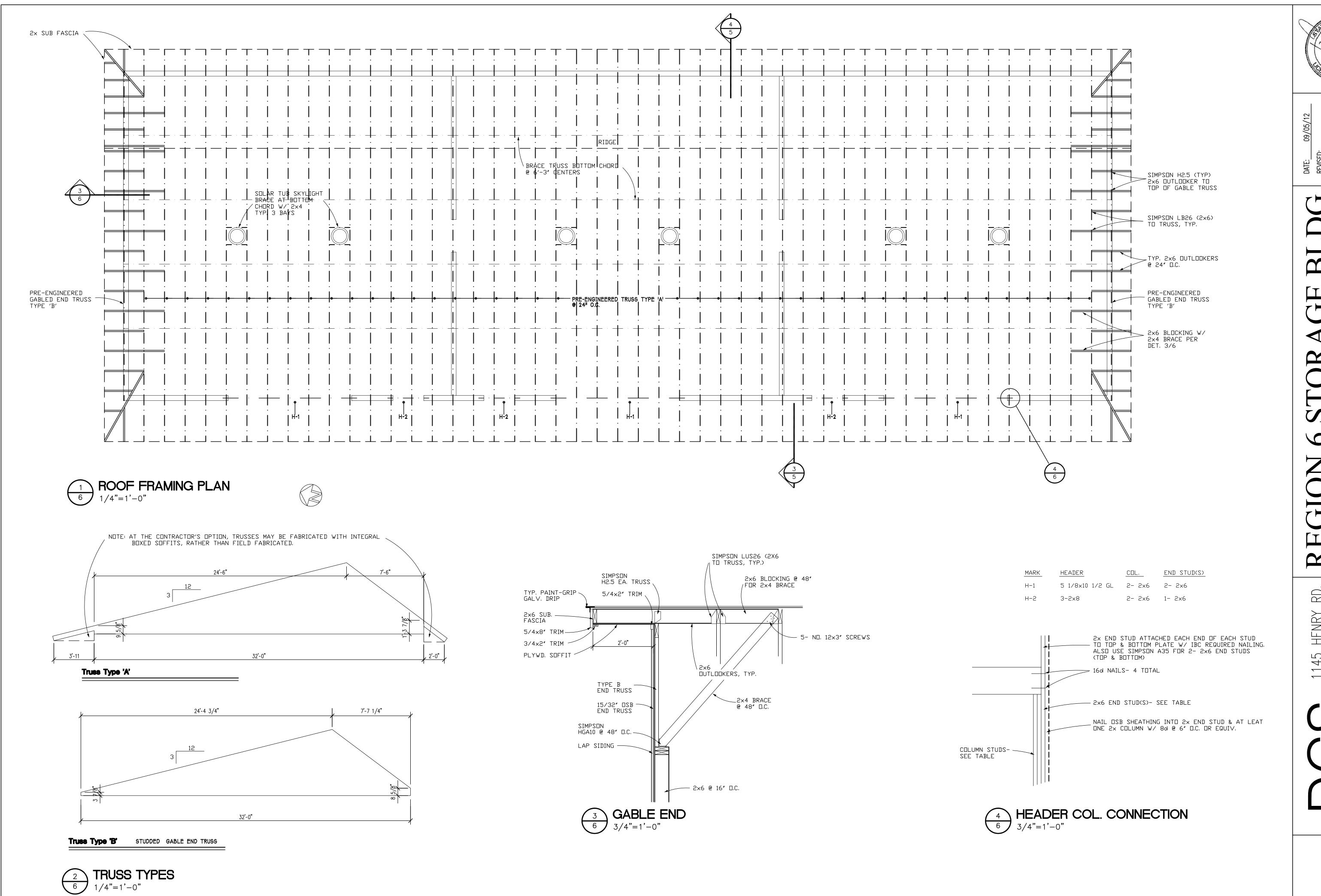
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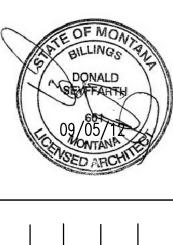
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ARCHITECTURAL SPECIFICATIONS SECTION 02150- CLEARING AND GRUBBING 1. ALL CLEARING AND GRUBBING HAS BEEN COMPLETED BY OTHERS. SECTION 02203- SITE GRADING AND EXCAVATION 1. SITE HAS BEEN GRADED BY OTHERS. GENERAL CONTRACTOR IS RESPONSIBLE FOR THE GRADING WITHIN 10 FOOT OF THE FRONT AND SIDE OF THE BUILDING AND 20 FEET BEHIND THE BUILDING. 2. CONTRACTOR IS TO TAKE CARE SO AS NOT TO DISTURB EXISTING GEO-FABRIC BENEATH FINISH SURFACE, OR DISTURB EXISTING PARKING AREA CONTOURS. SECTION 03300- CAST-IN-PLACE CONCRETE 1. SEE STRUCTURAL SPECIFICATION FOR CONCRETE REQUIREMENTS. 2. SEE PLANS FOR SLAB FINISHES. 3. CURE/SEAL SLAB WITH W.R. MEADOWS "SEALTIGHT" CURUNG COMPOUND OR EQUAL. 4. PROTECT ALL CONCRETE FROM DAMAGE DUE TO WEATHER OR CONSTRUCTION PROCESS. SECTION 05120- STRUCTURAL STEEL. 1. STRUCTURAL SPECIFICATION FOR STRUCTURAL STEEL REQUIREMENTS. SECTION 06100- ROUGH CARPENTRY 1. SEE STRUCTURAL SPECIFICATION FOR GRADING AND NAILING REQUIREMENTS. 2. ALL DIMENSIONED LUMBER TO BE STAMPED WITH GRADE AND SPECIES. 3. ALL WOOD PRODUCTS IN CONTACT WITH CONCRETE TREATED IN ACCORDANCE WITH 4. WOOD BASED STRUCTURAL PANELS: DOC PS 2. PROVIDE PLYWOOD COMPLYING WITH DOC PS 1, WHERE PLYWOOD IS INDICATED. 5. PROVIDE FACTORY MARKED PANELS COMPLYING WITH GRADE REQUIREMENTS AND SPAN RATINGS REQUIRED BY SUPPORT SPACING INDICATED. AIR-INFILTRATION BARRIER- TYVEK FASTENERS- SIZE AND TYPE INDICATED, PROVIDE HOT DIPPED ZINC WHERE EXPOSED TO WEATHER, GROUND, OR HIGH RELATIVE HUMIDITY. METAL FRAMING ANCHORS- HOT DIPPED GALVANIZED, TYPE AND SIZE AS INDICATED. SILL SEAL- GLASS-FIBER, 1 INCH THICK OR COMPRESSIBLE FOAM. SECTION 06176- METAL PLATE CONNECTED WOOD TRUSSES 1. SEE STRUCTURAL SPECIFICATION FOR LOAD REQUIREMENTS. 2. SUBMIT SHOP DRAWINGS WITH STATE LICENSED ENGINEERS STAMP AND PRODUCT DATA. 3. COMPLY WITH ANSI/TPI 1; TPI COMMENTARY AND RECOMMENDATIONS. LUMBER- COMPLY WITH DOC PS 20 CONNECTOR PLATES- STRUCTURAL QUALITY STEEL SHEETS, ZINC COATED. FASTENERS- HOT DIP GALVANIZED PER ASTM A 153 METAL FRAMING ANCHORS- HOT DIP, ZINC COATED STEEL SHEET COMPLYING WITH ASTM A 653, G60 COATING DESIGNATION. 5. FABRICATE AND INSTALL TRUSSES WITHIN TOLERANCES OF ANSI/TPI 1 6. DO NOT ALTER, CUT OR REMOVE TRUSS MEMBERS. SECTION 06185- STRUCTURAL-GLUED LAMINATED TIMBER 1. SEE STRUCTURAL SPECIFICATION FOR GLU-LAMINATED TIMBER REQUIREMENTS. 2. APPEARANCE- INDUSTRIAL GRADE. 3. SEAL COAT AFTER FABRICATION WITH CLEAR PENETRATING SEALER. SECTION 06200- FINISH CARPENTRY 1. LUMBER STANDARDS: DOC PS 20. 2. STANDING AND RUNNING TRIM: THE PRIMARY TRIM PROFILES FOR THIS BUILDING ARE "MIRATEC" PRE-PRIMED COMPSITE WOOD TRIM. PROVIDE LONGEST POSSIBLE LENGTHS. 3. EXTERIOR PLYWOOD SOFFITS: PROVIDE 3/8" ROUGH SAWN FIR PLYWOOD SOFFITS PRIMED AND BACKPRIME PRIOR TO INSTALLATION. ARRANGE PANELS SO THAT ALL JOINTS WILL BE CONCEALED BY BATTENS. 4. COMPOSITE SIDING: HARDIPLANK SELECT CEDARMILL LAP SIDING, WITH HARDY "PRIME-PLUS" FACTORY SEAL AND PRIME APPLIED, FURNISH IN 5 1/4" FOR 4" EXPOSURE, 5. FASTENERS: FASTEN WITH STAINLESS STEEL, HOT DIP GALVANIZED OR NONCORRODING ALUMINUM NAILS. ATTACH AS PER MANUFACTURER'S INSTRUCTIONS, INCLUDING SIZE, SECTION 07115- BITUMINOUS DAMPPROOFING 1. MANUFACTURERS: SONNEBORN "HYDROCIDE 600" OR APPROVED EQUAL. APPLIED AS PER MANUFACTURER'S INSTRUCTIONS, AND TO RECOMMENDED MIL THICKNESS. SECTION 07311- ASPHALT SHINGLES 1. SHINGLES: GAF TIMBERLINE "ULTRA" SERIES SHINGLES, COLOR- HEATHER, WATERPROOF UNDERLAYMENT: MINIMUM 40 MIL THICK, SELF ADHERING, POLYMER-MODIFIED. BITUMINOUS MEMBRANE. COMPLYING WITH ASTM D 1970. EQUAL TO GAF STORM GUARD. UNDERLAYMENT- GAF "SHINGLE MATE" ASPHALTIC CEMENT- ASTM D 4586 NAILS- ALUMINUM OR HOT DIP GALVANIZED STEEL ROOFING NAILS OF SUFFICIENT TO PENETRATE AT LEAST 1/8" THROUGH PLYWOOD SHEATHING. METAL DRIP EDGE, PAINTABLE, BRAKE-FORM, WITH MIN. 2" ROOF DECK FLANGE AND 1 1/2" FASCIA FLANGE SOFFIT VENT- 2" WIDE, PREFINISHED ALUMINUM, COLOR AS SELECTED. 4. GUTTERS AND DOWNSPOUTS- PROVIDE 6", 20 GA. PRE-FINISHED ALUMINUM GUTTER AND OPEN FACED DOWNSPOUTS WITH ALL ACCESSORIES, INCLUDING "HANGTITE BRACKETS AND ALUMINUM LEVELING WEDGES. PLACE BRACKETS AT18" D.C AND WEDGES AT 36" D.C. 5. CONTINUOUS RIDGE VENT: AIR VENT INC- SHINGLE VENT II OR EQUAL. SECTION 07920- JOINT SEALANTS 1. SUBMIT PRODUCT DATA AND COLOR SAMPLES. 2. COMPATIBILITY: PROVIDE JOINT SEALANTS, JOINT FILLERS AND OTHER RELATED 3, MATERIALS THAT ARE COMPATIBLE WITH ONE ANOTHER AND SUBSTRAITS UNDER SERVICE AND APPLICATION CONDITIONS. 4. SEALANT FOR EXTERIOR USE: DOW M791 SECTION 08311- HOLLOW METAL DOORS AND FRAMES 1. SUBMIT SHOP DRAWINGS SHOWING, MATERIAL, GAGE, AND HARDWARE LOCATION. 2. HOLLOW METAL FRAME TO BE 16 GAGE, HEAVY DUTY, HOT DIP GALVANIZED. 3. DOORS TO BE 18 GAGE, INSULATED, HEAVY DUTY, HOT DIP GALVANIZED. 4. TO HAVE WELDED, MITERED JOINTS, GROUND SMOOTH. 5. DOOR TO HAVE AN INSULATION VALUE OF R-14 OR GREATER 6. REINFORCE AT ALL HAREWARE LOCATIONS. 7. ALL DOORS AND FRAMES TO BE FACTORY PRIMED. 8. COMPLY WITH ANSI A250.8 AND A250.11 9. ACCEPTABLE MANUFACTURERS ARE: AMWELD, CECO, CURRIES, STEELCRAFT 10. SHIP ALL FRAMES WITH REMOVABLE ANGLE SPREADER. 11. STORE DOORS AND FRAMES UPRIGHT IN DRY AREA.

SECTION 08313- SECTIONAL GARAGE DOORS 1. SUBMIT SHOP DRAWINGS SHOWING, MATERIAL, GAGE, HARDWARE AND ELECTRICAL COMPONENTS AND INSTALLATION DETAILS OF GARAGE DOOR SYSTEM. 2. DOOR OPERATION TO BE ELECTRICAL WITH CHAIN HOIST. 3. PROVIDE OPERATION AND MAINTENANCE DATA AT CLOSEOUT 4. DOOR SECTIONS TO BE 1 1/2", INSULATED, 20 GAGE, PREFINISHED ALUMINUM, WITH 3 CLEAR 1/4" GLASS LITES. 5. FACE PANELS: STANDARD GROOVED PATTERN. 6. TRACK: 2" WIDE, ROLLED FORMED GALVANIZEDE STEEL. 7. HINGE AND ROLLER: HEAVY DUTY HINGES ANSD ADJUSTABLE ROLLER HOLDERS. 8. WEATHERSTRIPPING: MANUFACTURERS STANDARD PERIMETER. 9. ELECTRIC OPERATOR: CENTER MOUNT DRAW BAR MANUALLY OPERABLE IN CASE OF POWER OUTAGE. SINGLE PHASE, 115 VAC 24 VOLT CONTROL STATION MARKED OPEN, CLOSE, STOP 10. ACCEPTABLE MANUFACTURERS: CHI OVERHEAD DOORS OVERHEAD DOOR CORP. RAYNOR WAYNE-DALTON CORP. SECTION 08625- TUBULAR DAYLIGHTING DEVICE 1. TUBULAR DAYLIGHTING DEVICE, CONSISTING OF ROOF DOME, FLASHED INTO SHINGLES, REFLECTIVE TUBE, AND DIFFER ASSEMBLY. 2. SUBMIT PRODUCT DATA TO INCLUDE, PREPARATION INSTRUCTIONS, STORAGE AND HANDLING, AND INSTALLATION METHODS. 3. INCLUDE MANUFACTURER'S STANDARD 10 YEAR WARRANTY. 4. MANUFACTURER: SOLATUBE, MODEL 290DS OR APPROVED EQUAL. 5. CHARACTERISTICS: 14" DIAMETER, 0.015" THICK ALUMINUM TUBE. UV INHIBITING, IMPACT RESISTANT INJECTION MOLDED ACRYLIC DOME. HIGH IMPACT RESISTANT INNER DOME GLAZING. ONE PIECE ROOF FLASHING BASE FOR PITCHED SHINGLED ROOF. ALL OTHER ITEMS NECESSARY FOR A COMPLETE SYSTEM, AS SHOWN. SECTION 08710- DOOR HARDWARE 1. SUBMIT SHOP DRAWINGS TO INCLUDE, PRODUCT DATA, FINISHES, AND DESCRIPTION. 2. ALL HARDWARE TO BE DELIVERED IN MARKED PACKAGES 3. CONSULT OWNER FOR KEYING SCHEDULE. 4. SEE HARDWARE SCHEDULE FOR PRODUCT SELECTION. 5. APPROVED MANUFACTURERS: HINGES- BOMMER, IVES, STANLEY, MCKINNEY LOCKSETS- SCHLAGE ND SERIES, SARGENT 10 LINE, BEST 93K CLOSERS- LCN 4040 SERIES, SARGENT 281 SERIES, NORTON 7500 SERIES DOORS STOPS- IVE, TRIMCO, HAGER WEATHERSTRIP AND THRESHOLDS- NATIONAL GUARD, PEMKO, REESE, ZERO. 8. KEYS SOLID BRASS OR NICKEL SIVER, STAMPED "DO NOT DUPLICATE" PROVIDE CONSTRUCTION KEYING PROVIDE 4 KEY FOR EACH LOCK AND 3 MASTER KEYS. 9. LOCKSETS, CLOSERS, AND TRIM AFTER PAINTING 10. SET THRESHOLD IN MASTIC AND SECURE. SECTION 09910 PAINTING 2. DBTAIN PRIMERS, AND UNDERCOAT MATERIAL FROM THE SAME MANUFACTURER. 3. PAINT ALL EXTERIOR MEXPOSED SURFACES EXCEPT CONCRETE. 4. DELIVER TO OWNER 1 GAL. OF EACH TYPE OF PAINT AND COLOR, LABELED, UNOPENED. 5. ACCEPTABLE PRODUCTS: BEST QUALITY COLUMIA, PITTSBURGH OR SHERWIN-WILLIAMS 6. PAINT SCHEDULE: COLUMBIA NUMBERS USED. PIPE COLUMNS- GLOSS ENAMEL PRIMER- 04-022 SERIES RED DXIDE METAL PRIMER ZINC PHDSPHATE FINISH COAT- 2 COATS 04-400 SERIES POLYURETHANE ENAMEL EXTERIOR PRE-PRIMED MIRATEC TRIM, HARDIBOARD SIDING AND MISC. TRIM. PRIMER NOT REQUIRED EXCEPT FOR CUT ENDS. USE 05-200-PP. FINISH COAT- 2 COATS 02-040 SERIES MASTERPIECE INT/EXT EGGSHELL. EXTERIOR UNPRIMED WOOD SOFFIT AND BATTENS. PRIMER- 05-200PP. BACKPRIME WOOD SOFFIT PANELS PRIOR TO INSTALLATION. FINISH COAT- 2 COATS 01-265 SERIES ACRY-SHIELD EGGSHELL ENAMEL. 7. HOLLOW METAL DOORS AND FRAMES. PRIMER- 05-550 INDUSTRIAL UNIVERSAL METAL PRIMER. FINISH COAT- 2 COATS 01-242 MASTERPIECE EXTERIOR ACRYLIC SEMI GLOSS. 8. ALL COLORS SELECTED BY OWNER



DATE: 09/05/12
REVISED: OB NO.:

EGION 6 STORAGE BLDC FWP PROJECT NO. 7099126

1145 HENRY RD. BILLINGS, MT. 406-252-9631

EWC - ELECTRIC WATER COOLER

FLA - FULL LOAD AMPS

NOTE: ALL ABBREVIATIONS SHOWN ARE NOT NECESSARILY USED.

FVNR - FULL VOLTAGE, NON-REVERSING NIC ABOVE COUNTER NOT IN CONTRACT AFC - ABOVE FINISHED CEILING FULL VOLTAGE. REVERSING NIGHT LIGHT ABOVE FINISHED FLOOR AFF FWE - FURNISHED WITH EQUIPMENT NO NORMALLY OPEN AFG - ABOVE FINISHED GRADE GROUND FAULT INTERRUPTER NTS - NOT TO SCALE AMPS INTERRUPTING CURRENT GRC - GALVANIZED RIGID CONDUIT OC — OVER CURRENT OL - OVERLOAD HOA - HAND-OFF-AUTOMATIC ALUMINUM - BELOW FINISHED GRADE HORSEPOWER PT — POTENTIAL TRANSFORMER - CIRCUIT BREAKER ISOLATED GROUND RVNR - REDUCED VOLTAGE, NON-REVERSING CORROSION RESISTANT LIGHTING CONTACTOR SC - SHORT CIRCUIT CONTROL POWER TRANSFORMER LOR LOCAL—OFF—REMOTE SR - SAFE OR STOP/RUN CURRENT TRANSFORMER LEVEL SWITCH TTB - TELEPHONE TERMINAL BOARD COPPER LET THROUGH TVSS - TRANSIENT VOLTAGE SURGE SUPPRESSER UG – UNDERGROUND END OF LINE RESISTOR MCA - MINIMUM CIRCUIT AMPS – EMERGENCY MCB - MAIN CIRCUIT BREAKER VFD - VARIABLE FREQUENCY DRIVE - EMERGENCY STOP MCC - MOTOR CONTROL CENTER WG - WIREGUARD ETM - ELAPSED TIME METER MCCB - MOLDED CASE CIRCUIT BREAKER WP - WEATHERPROOF

MCP - MOTOR CIRCUIT PROTECTION

MLO - MAIN LUGS ONLY

NC - NORMALLY CLOSED



Mechanical, Electrical & Energy Consultants

175 North 27th Street, Suite 1312 Billings, MT 59101-2048 406.256.1141 www.mkkeng.com

7600 East Orchard Road, Suite 250-S Greenwood Village, CO 80111-2518 303.796.6000

500 West 18th Street, Suite 200 Cheyenne, WY 82001-4368 307.634.7647

ELECTRICAL LEGEND

NOTE: ALL SYMBOLS SHOWN ON LEGEND ARE NOT NECESSARILY USED.

XFMR - TRANSFORMER

XP - EXPLOSION PROOF

ZS - LIMIT OR POSITION SWITCH

<u>POWER</u>

STRAIGHT BLADE DUPLEX RECEPTACLE

SUBSCRIPTS: HG = HOSPITAL GRADE

HGT = HOSPITAL GRADE TAMPER RESISTANT

GFI = GROUND FAULT INTERRUPTER SS = SURGE SUPRRESSION

AC = 6" ABOVE COUNTER STRAIGHT BLADE DOUBLE DUPLEX RECEPT. (FOURPLEX)

STRAIGHT BLADE SINGLE RECEPTACLE

STRAIGHT BLADE DUPLEX RECEPT. HALF-SWITCHED STRAIGHT BLADE DUPLEX RECEPT. ON EMERGENCY CIRCUIT

OUTLET WITH SPECIAL DEVICE, AS NOTED WALL MOUNTED OUTLET WITH SPECIAL DEVICE,

FLOOR MOUNTED POWER BOX, AS NOTED

POKE THROUGH, AS NOTED PEDESTAL OUTLET, AS NOTED JUNCTION BOX, AS NOTED

OUTLET BOX (J)H WALL MOUNTED OUTLET BOX

ABOVE CEILING POWER DISTRIBUTION BOX

SURFACE RACEWAY, AS NOTED CH CLOCK HANGER OUTLET TELE-POWER POLE PB PULL BOX

(M) CONNECTION TO MOTOR MAGNETIC MOTOR STARTER SUBSCRIPTS:

> MS = MULTISPEEDSSRV = SOLID-STATE, REDUCED VOLTAGE

VF = VARIABLE FREQUENCY NP SAFETY DISCONNECT SWITCH FY FUSED DISCONNECT SWITCH

COMBINATION DISCONNECT AND STARTER ENCLOSED CIRCUIT BREAKER, MOLDED-CASE, THERMAL-MAGNETIC SUBSCRIPTS:

> AT = ADJUSTABLE TRIP EAT = ELECTRONIC ADJUSTABLE TRIP

CL = CURRENT LIMITING IF = INTEGRALLY FUSED

GFCI = GROUND FAULT CIRCUIT INTERRUPTER

ST = SHUNT TRIPKI = KEY INTERLOCK

ZSI = ZONE-SELECTIVE INTERLOCKING

CONNECTION TO PRE-WIRED EQUIPMENT

PANELBOARD MCC MOTOR CONTROL CENTER TRANSIENT VOLTAGE SURGE SUPPRESSOR TRANSFORMER ENGINE GENERATOR

FIRE ALARM SYSTEM

FACP FIRE ALARM CONTROL PANEL FAGP FIRE ALARM GRAPHIC PANEL FAAP FIRE ALARM ANNUNCIATOR PANEL

MANUAL PULL STATION FIRE ALARM STROBE EX GENERAL ALARM COMBINATION HORN/STROBE

H FIRE ALARM HORN

EH CEILING OR WALL MOUNTED DETECTOR SUBSCRIPTS:

> I = IONIZATION= THERMAL, FIXED AND

RATE-OF-RISE = THERMAL, FIXED T165° = 165°F THERMAL, FIXED AND

RATE-OF-RISE TF165° = 165°F THERMAL, FIXED

= PHOTOELECTRIC PT = COMBINATION PHOTOELECTRIC AND **THERMAL**

SMOKE DETECTOR IN VENTILATING DUCT FAN SHUT-DOWN CONNECTION MAG. DOOR HOLDER SPRINKLER SYSTEM FLOW SWITCH

SPRINKLER SYSTEM TAMPER SWITCH FIREFIGHTERS TELEPHONE JACK LIFE SAFETY SPEAKER

LIFE SAFETY SPEAKER WITH STROBE DH REMOTE PILOT LIGHT OH REMOTE PILOT LIGHT WITH TEST SWITCH

MONITOR MODULE CONTROL MODULE

DAMPER CONNECTION

COMMUNICATION SYSTEM

FLOOR MOUNTED TELEPHONE AND/OR DATA OUTLET BOX, AS NOTED

▼ WALL MOUNTED TELEPHONE OUTLET WALL MOUNTED DATA OUTLET

WALL MOUNTED COMBINATION TELEPHONE/DATA **OUTLET BOX** W WALL MOUNTED TELEPHONE OUTLET, +48" AFF P PAY PHONE

TELEPHONE TERMINAL BOARD — TTB S SH CEILING OR WALL MOUNTED SPEAKER

M H FLOOR OR WALL MOUNTED MICROPHONE OUTLET ⟨C⟩ CALL—IN SWITCH

S TIME-TONE UNIT () CEILING OR WALL MOUNTED CLOCK (B)H PROGRAM BELL

BUZZER HOUSE PHONE/INTERCOM MASTER INTERCOM STATION TELEVISION ANTENNA OUTLET CLOSED CIRCUIT TV OUTLET AMPLIFIER

SCHEMATIC WIRING GRAPHICS

GROUND CONNECTION AS NOTED — DISCONNECT SWITCH MAGNETIC MOTOR STARTER

> SUBSCRIPTS: MS = MULTISPEED

SSRV = SOLID-STATE, REDUCED VOLTAGE VF = VARIABLE FREQUENCY

CIRCUIT BREAKER, MOLDED-CASE. THERMAL-MAGNETIC **SUBSCRIPTS:**

> AT = ADJUSTABLE TRIP EAT = ELECTRONIC ADJUSTABLE TRIP

CL = CURRENT LIMITING IF = INTEGRALLY FUSED

GFCI = GROUND FAULT CIRCUIT INTERRUPTER

ST = SHUNT TRIPKI = KEY INTERLOCK

ZSI = ZONE-SELECTIVE INTERLOCKING ENCLOSED CIRCUIT BREAKER, MOLDED-CASE, THERMAL-MAGNETIC

ENCLOSED FUSED DISCONNECT SWITCH

POWER TRANSFORMER CURRENT TRANSFORMER **AMMETER**

VOLT METER TRANSFER SWITCH

GROUND FAULT PROTECTION



MOTOR, NUMBER INDICATES HORSEPOWER

LIGHTING

DOWNLIGHT

WALL MOUNTED FLUORESCENT OR INCANDESCENT LUMINAIRE, AS NOTED

-O-OH CEILING OR WALL MOUNTED HID LUMINAIRE PORCELAIN KEYLESS SURFACE MOUNTED FLUORESCENT LUMINAIRE

RECESS MOUNTED FLUORESCENT LUMINAIRE RECESS MOUNTED FLUORESCENT LUMINAIRE WITH MODULAR WIRING CONNECTOR

FLUORESCENT STRIP LUMINAIRE TRACK LIGHT, AS NOTED OR SCHEDULED DIRECTIONAL ACCENT OR WALL-WASH LUMINAIRE EXTERIOR POLE MOUNTED LUMINAIRE, AS SCHEDULED

BOLLARD INSTALL FACES AS INDICATED BY SHADING

EMERGENCY LIGHT AS NOTED

CIRCUITING

→ CONDUIT RUN CIRCUIT HOMERUN TO PANEL OR CABINET, NO. OF ARROWS INDICATE NO. OF CIRCUITS

CIRCUIT TURNED UP CIRCUIT TURNED DOWN

── CONDUIT STUB-OUT - CAP & MARK CIRCUIT IN FLEXIBLE CONDUIT → SEALOFF

SWITCHING

S WALL MOUNTED SWITCH SUBSCRIPTS:

2 = DOUBLE POLE 3 = 3 - WAY

4 = 4 - WAYD = DIMMER

K = KEY-OPERATEDT = THERMAL OVERLOAD

SS DUAL LEVEL SWITCHING

NOTATIONS

1 - UPPER CASE LETTER AT LUMINAIRES (F1, I1, ETC.) INDICATES LUMINAIRE TYPE. (F1) = TYPE F1 LUMINAIRES IN AREA INDICATED.

2 - LOWER CASE LETTER AT LUMINAIRES AND SWITCHES (a, b, ETC.) INDICATE ASSOCIATED UNITS FOR SWITCHING.

3 - SHADING WITHIN LUMINAIRE DENOTES LIGHTING FIXTURE WITH EMERGENCY

4 - "NL" WITHIN LUMINAIRES DENOTES UNIT ON NIGHT LIGHT CIRCUIT.

5 - PLUS (+) SIGN WITH DIMENSION AT OUTLET INDICATES HEIGHT ABOVE FINISHED FLOOR OR GRADE TO CENTERLINE OF OUTLET.

OCCUPANCY SENSORS

WALL SWITCH, WA-200 TIMED SWITCH, TS-400 WALL MOUNTED INFRARED, WPIR WALL MOUNTED INFRARED, CX-105

CEILING MOUNTED DUAL TECH, DT-305 PIR CEILING SENSOR, CI-205 CEILING ULTRASONIC, WT-605 CEILING ULTRASONIC, WT-1105

CEILING ULTRASONIC, WT-2205 CEILING ULTRASONIC, WT-2255

WALL MOUNTED, DUAL TECH., DT-205 INLINE POWER PACK, B120E-P NOTE: ALL MODEL NUMBERS SHOWN ARE

WATTSTOPPER.

GENERAL NOTES (FOR ALL ELECTRICAL SHEETS)

1. THESE DRAWINGS ARE DIAGRAMMATIC. REFER TO ARCHITECTURAL DRAWINGS FOR EXACT

2. ALL 120V BRANCH CIRCUITS SHALL BE 3-WIRE (PHASE, NEUTRAL, GROUND). PHASE, NEUTRAL, AND GROUND CONDUCTORS SHALL BE SIZE 12 AWG UNLESS OTHERWISE NOTED. BRANCH CIRCUITS SHOWN AS A SINGLE HOMERUN SHALL NOT BE COMBINED WITH OTHER CIRCUITS. ALL BRANCH CIRCUITS AND FEEDERS SHALL HAVE EQUIPMENT GROUNDING CONDUCTORS INSTALLED IN THE RACEWAY.

3. REFER TO ARCHITECTURAL PLANS, ELEVATIONS AND DIAGRAMS FOR LOCATIONS OF FLOOR AND WALL DEVICES. IF DEVICES ARE NOT NOTED OTHERWISE THEY SHALL BE MOUNTED LONG AXIS VERTICAL AT THE FOLLOWING HEIGHTS AFF TO CENTER OF DEVICE: SWITCHES +48", RECEPTACLES +18", VOICE/DATA JACKS +18".

4. COORDINATE EXACT EQUIPMENT LOCATIONS WITH OWNER PRIOR TO ROUGH-INS. COORDINATE WIRING DEVICE LOCATIONS WITH ARCHITECTURAL ELEVATIONS, CASEWORK SHOP DRAWINGS AND EQUIPMENT INSTALLATION DRAWINGS. COORDINATE LOCATION OF LUMINAIRES WITH ARCHITECTURAL REFLECTED CEILING PLANS.

5. ANY ITEMS DAMAGED BY THE CONTRACTOR SHALL BE REPLACED BY THE CONTRACTOR, AT NO ADDITIONAL COST TO THE OWNER.

6. ADA COMPLIANCE: ELECTRICAL DEVICES PROJECTING FROM WALLS WITH THEIR LEADING EDGES BETWEEN 27" AND 80" AFF SHALL PROTRUDE NO MORE THAN 4" INTO WALKS

7. DUAL LEVEL SWITCHING SHALL BE (2) SWITCHES IN A 2-GANG BOX. EACH SWITCH SHALL CONTROL 2-LAMPS IN EACH FIXTURE, UNLESS OTHERWISE INDICATED ON

8. SITE PLAN DOES NOT INDICATE ALL OF THE UG UTILITY LINES, RE: CIVIL DRAWINGS FOR ADDITIONAL INFORMATION. CONTRACTOR TO FIELD VERIFY EXACT LOCATION OF ALL EXISTING UNDERGROUND UTILITY LINES OF ALL TRADES PRIOR TO ANY SITE WORK.

DRAWING LAYOUT

COVER SHEET

ELECTRICAL SITE PLAN, ONE-LINE DIAGRAM

ELECTRICAL PLAN

SPECIFICATIONS

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K.M. STRATTON

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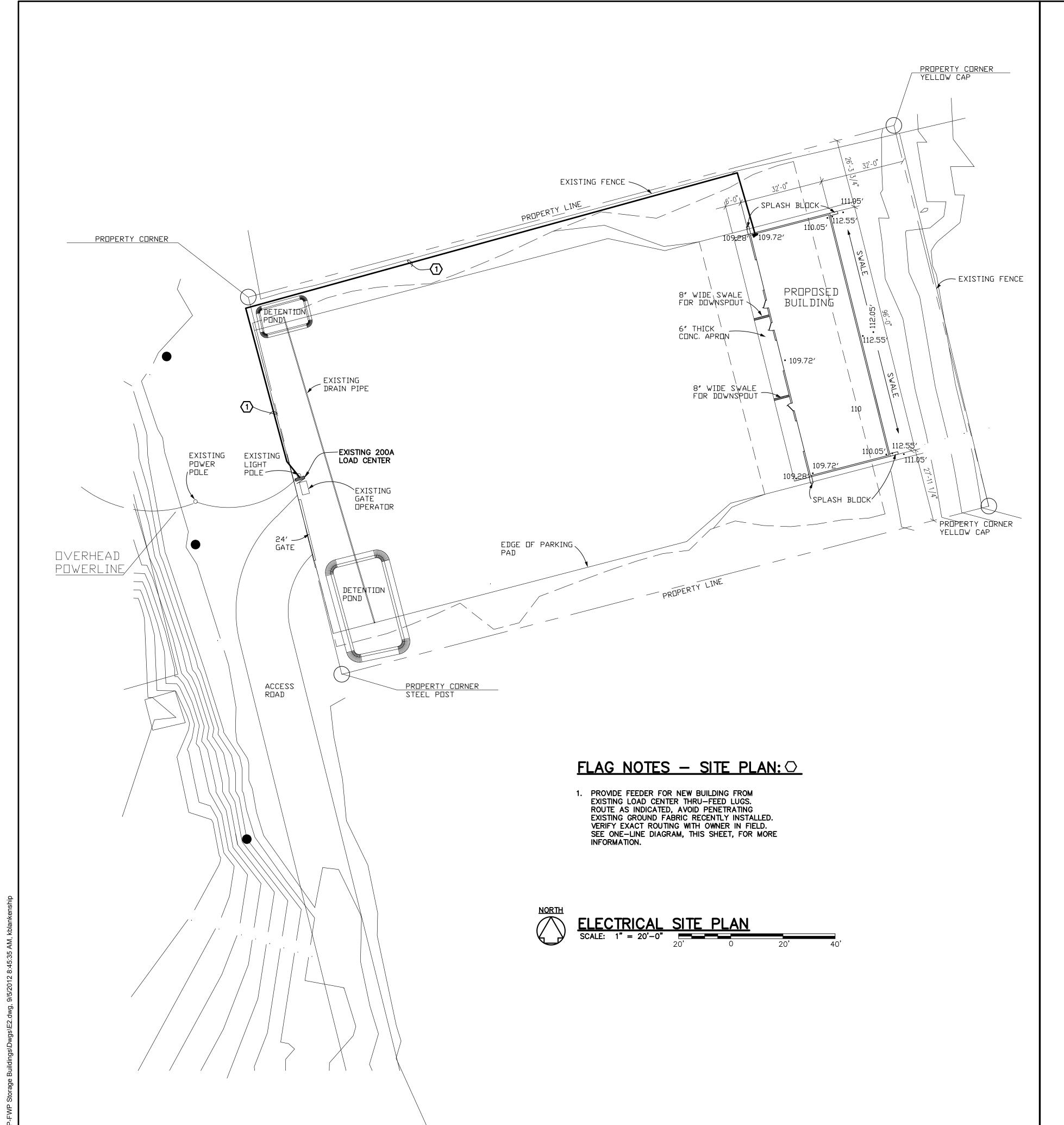
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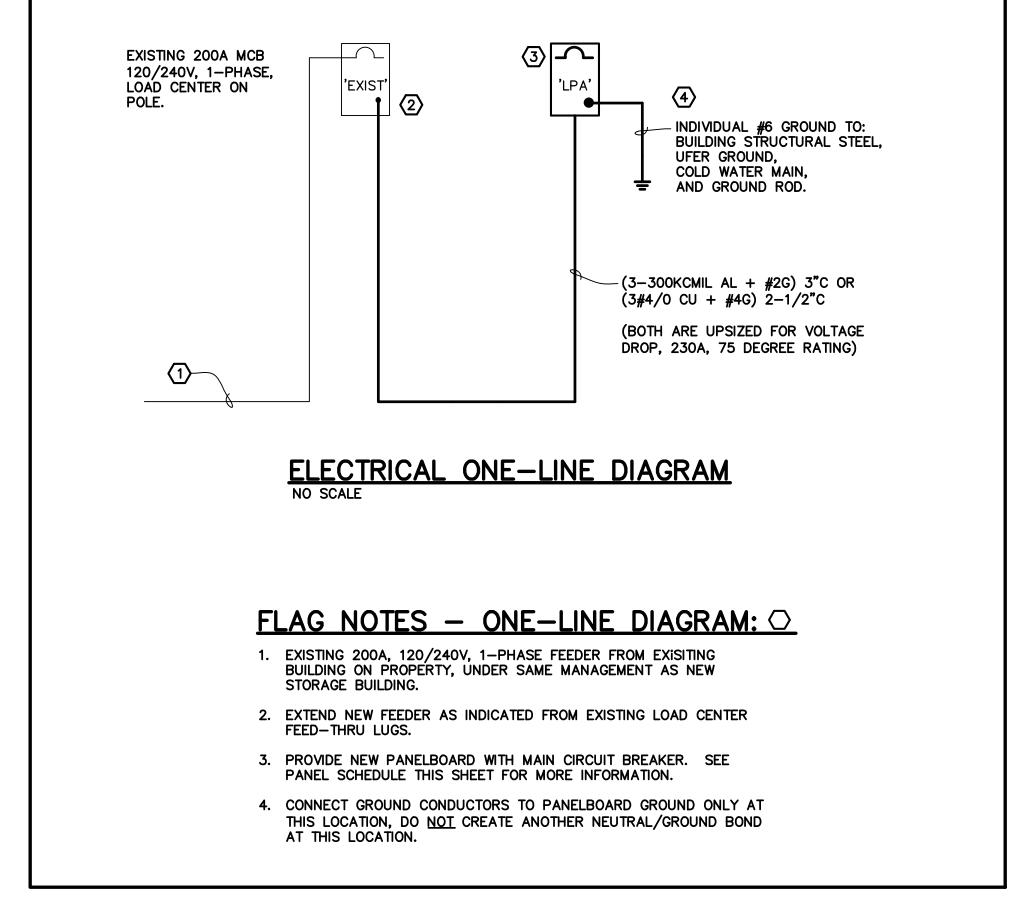
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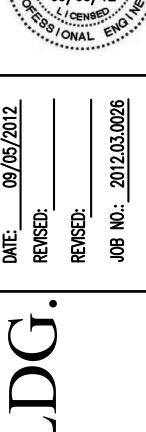
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				PAN	IEL		"LP	Α"				
120/	240	VOLT	,	PHAS	E				3	WIRE SEF	RVICE	
200 AMP						GROUND	BUS					
<u>10K</u> AIC	A MAIN CB			100% NEUTRAL BUS				S	SURFACE MOUNTED			
			TISIO								TISIO	
DESCRIPTION	L	R	M A E H			PHASE			L	R	MAEH	DESCRIPTION
EXTERIOR LIGHTS	150				1	L1	2		720			LIGHTS-NORTH BAY
N BAY-DOOR OPENER			M 830)	3	L2	4		720			LIGHTS-CENTER BAY
N BAY-WEST PLUGS		360			5	L1	6		720			LIGHTS-SOUTH BAY
N BAY-SOUTH PLUGS		720			7	L2	8					SPR
C BAY-NORTH PLUGS		720			9	L1	10					SPR
C BAY-DOOR OPENER			M 830		11	L2	12					SPR
C BAY-WEST PLUGS		360			13	L1	14			720		N BAY-NORTH PLUG
C BAY-SOUTH PLUGS		760			15	L2	16			720		N BAY-EAST PLUGS
S BAY-NORTH PLUGS		760			17	L1	18			720		C BAY-NORTH PLUG
S BAY-DOOR OPENER			M 830		19	L2	20			720		S BAY-NORTH PLUG
S BAY-WEST PLUGS		360			21	L1	22			720		S BAY SOUTH PLUG
N BAY-WEST PLUGS					23	L2	24					SPR
SPR					25	L1	26					SPR
SPR					27	L2	28					SPR
SPR					29	L1	30					SPR
SPR					31	L2	32					SPR
SPR					33	L1	34					SPR
SPR					35	L2	36					SPR
SPR					37	L1	38					SPR
SPR					39	L2	40					SPR
SPR					41	L1	42					SPR
			M 2490		L	DADS IN					М	0
TOTAL	150	4040	A (VOL	T-AMPE	RES		2160	3600	A	OTOTAL
			E C)							E	o
		CONI	NECTED	D.F.		DEMAND)				•	•
LIGHTING		2.3		1.25		2.9				CONNECT	ΈD	12.4 KVA
RECEPT. (FIRST 10 KW)		7.6		1.00		7.6				DESIGN		48.0 KVA
RECEPT. (REMAINDER)		0.0		0.50		0.0				DEMAND		13.2 KVA
MOTORS		1.7		1.00					SPARE 34.8 KVA			
LARGEST MOTOR		0.8		1.25		1.0				CONNECT	ΈD	
APPLIANCES		0.0		1.00					L1 6.3 KVA			
EQUIPMENT		0.0		1.00		0.0					L2	6.1 KVA
HEATING		0.0		1.00		0.0						
TRANSFORMER		0.0		1.00		0.0						
OTHER		0.0		1.00		0.0						
		0.0		0.00		0.0						
				0.00		0.0						
				0.00		0.0						
TOTAL		12.4	KVA			13.2		Δ		All	CIRCUIT B	REAKERS
LOAD		51.8 AMPS			55.1 AMPS				ARE 20 AMP, 1 POLE			
DESIGN		51.0	, ,,,,,,,			200.0				4		OTHERWISE
SPARE						144.9						SPR = SPARE
JI AIL				1	<u> </u>	177.3	<u> </u>	<u> </u>		<u> </u>	- JI AUL	JIN - JIANL



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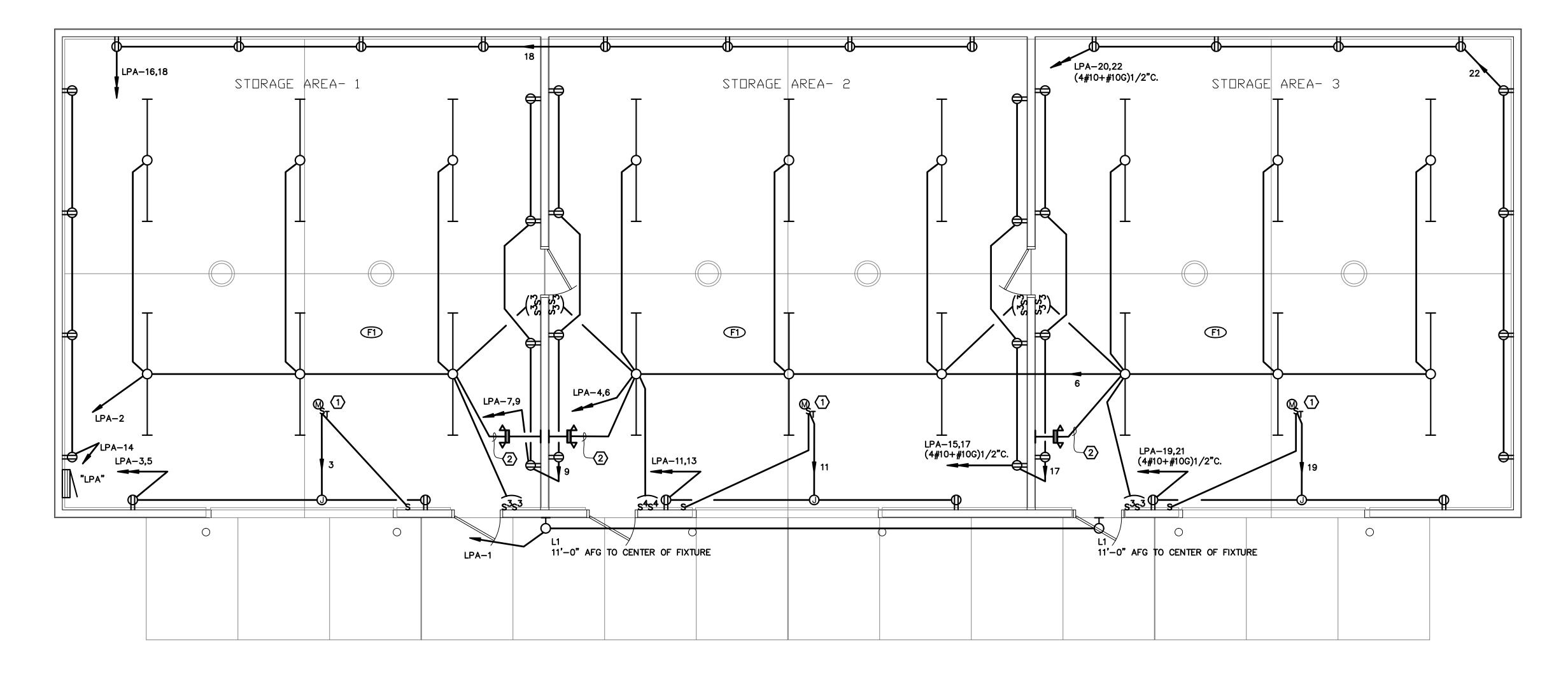
LIMMIAIDE COUEDINE													
	LUMINAIRE SCHEDULE												
TYPE		LAMPS	DESCRIPTION	VOLT	MOUNTING	MANUFACTURER, CAT. NUMBER							
	QTY.	CAT. NO.				·							
F1	4	F32T8SP30/	8' STRIP WITH 4' LAMPS AND SYMMETRIC REFLECTOR,	120	SURFACE	LITHONIA							
		ECO	2 BALLASTS FOR DUAL LEVEL SWITCHING CONTROL			TZ-2-32-120-(2)GEB10PS-(2)Z8SMR48							
L1	10	LEDS AND ENGINE	CUTOFF ARCH. WALL SCONCE, DIE CAST ALUMINUM HOUSING	120	SURFACE	LITHONIA							
		INCLUDED	INTEGRAL MOTION SENSOR/PHOTOCELL, DARK BRONZE		+11'-0" AFG	WST LED-1-10A700/40K-SR2-120-PE-PIR-DDBXD							
	2	INCLUDED	THERMOPLASTIC UNIT WITH SELF DIAGNOSTICS AND NICAD	120	SURFACE	CHLORIDE							
		WITH FIXTURE	LISTED FOR OPERATING TEMP OF 20 DEG F TO 104 DEG F		+8'-0" AFF	CTX12N24WCSWM							

GENERAL NOTES:

- A. ALL TYPE "F1" FIXTURES SHALL BE PROVIDED WITH 2 BALLASTS TO PROVIDE DUAL-LEVEL SWITCHING AS INDICATED ON DRAWING.
- B. INSTALL ALL LIGHTING AND DEVICES TO ALLOW FOR FUTURE 5/8" SHEETROCK, THROUGHOUT.
- C. INSTALL ALL RECEPTACLES AT 42" ABOVE FINISHED FLOOR, THROUGHOUT.
- D. INSTALL TYPE "F1" LIGHTING FIXTURES ON BOTTOM OF JOISTS, ALLOW SPACE FOR FUTURE 5/8" SHEETROCK.

FLAG NOTES THIS SHEET: O

- PROVIDE CONNECTION TO GARAGE DOOR OPENER. INSTALL AND CONNECT CONTROL SWITCH FURNISHED WITH OPENER AS INDICATED.
- INSTALL EMERGENCY LIGHTING FIXTURE AT 8'-0"
 ABOVE FINISHED FLOOR. CONNECT AHEAD OF
 ANY LOCAL SWITCHING OR CONTROL.





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SECTION 16010 - BASIC ELECTRICAL REQUIREMENTS.

- 1. PROVIDE ALL LABOR, MATERIALS, EQUIPMENT AND INCIDENTALS FOR COMPLETION OF ALL ELECTRICAL SYSTEMS DESCRIBED HERE IN. ALL ELECTRICAL EQUIPMENT AND MATERIAL SHALL BE INSTALLED IN ACCORDANCE WITH REQUIREMENTS, GOVERNING AUTHORITIES, AND IN A NEAT AND WORKMEN LIKE MANNER BY SKILLED AND COMPETENT ELECTRICIANS IN CONFORMANCE WITH THE STANDARD PRACTICES OF THE ELECTRICAL INDUSTRY. ALL ELECTRICAL SYSTEMS SHALL BE COMPLETE AND OPERATIONAL TO THE BENEFIT OF THE OWNER.
- A. GOOD WORKMANSHIP AND APPEARANCE ARE CONSIDERED EQUAL TO PROPER OPERATION.
- B. THE CONTRACTOR SHALL PROVIDE ALL FORSEEABLE ELECTRICAL EQUIPMENT AND ACCESSORIES NECESSARY, WHETHER SPECIFICALLY STATED OR NOT, TO MAKE THE REQUIRED ELECTRICAL SYSTEMS COMPLETE AND OPERATIONAL.
- 2. THE ELECTRICAL CONTRACTOR SHALL COMPLY WITH THE REQUIREMENTS OF THE GENERAL CONDITIONS, SUPPLEMENTAL GENERAL CONDITIONS OF THE PROJECT SPECIFICATIONS, ANY OWNER CRITERIA, AND ALL CONTRACT SPECIFICATIONS AND DOCUMENTS.
- 3. DEFINITIONS AND STANDARDS:
- A. "PROVIDE" MEANS CONTRACTOR IS RESPONSIBLE FOR THE FURNISHING AND INSTALLATION OF.
- B. "EXPOSED" MEANS WHERE IT CAN BE SEEN AFTER THE BUILDING IS COMPLETED SUCH AS IN EQUIPMENT ROOMS, UNFINISHED AREAS, ACCESSIBLE TUNNELS, ETC. WHERE CONDUIT/EQUIPMENT IS ACCESSIBLE.
- C. "CONCEALED" MEANS WHERE IT CANNOT BE SEEN AFTER THE BUILDING IS COMPLETED SUCH AS IN SPACES AS CHASES, TRENCHES, ABOVE CEILINGS, IN WALLS AND BURIED WHERE CONDUIT/WIRE IS INACCESSIBLE WHEN BUILDING IS COMPLETED.
- D. STANDARDS FOR MATERIALS: ALL MATERIALS SHALL BE NEW EXCEPT AS OTHERWISE STATED, AND SHALL CONFORM WITH THE CURRENT APPLICABLE INDUSTRY STANDARDS, NEMA STANDARDS AND UNDERWRITERS' LABORATORIES STANDARDS.
- 4. COORDINATE AND ORDER THE PROGRESS OF ELECTRICAL WORK TO CONFORM TO THE OWNER'S SCHEDULE AND THE PROGRESS OF THE WORK OF THE OTHER TRADES.
- 5. APPLY FOR AND PAY FOR ALL PERMITS, FEES, LICENSES AND INSPECTIONS FOR THIS DIVISION OF WORK.
- 6. PROVIDE TEMPORARY LIGHTING AND POWER AS REQUIRED.
- 7. VISIT THE PROJECT BEFORE SUBMITTING A BID AS NO EXTRAS WILL BE ALLOWED FOR LACK OF KNOWLEDGE OF OBVIOUS EXISTING CONDITIONS.
- 8. DRAWINGS ARE DIAGRAMMATIC IN NATURE. TAKE ALL DIMENSIONS FROM ARCHITECTURAL DRAWINGS, CERTIFIED EQUIPMENT DRAWINGS AND FROM THE STRUCTURE ITSELF BEFORE FABRICATING ANY WORK.
- 9. COMPLY WITH THE LATEST FEDERAL, STATE AND LOCAL CODES REQUIREMENTS, AND ORDINANCES, WITH THE NATIONAL ELECTRICAL CODE OF THE NATIONAL FIRE PROTECTION ASSOCIATION, AND WITH REQUIREMENTS OF THE POWER AND TELEPHONE COMPANIES FURNISHING SERVICES TO THE PROJECT. THE FOLLOWING IS A BRIEF LIST OF APPLICABLE CODES:
- A. NFPA NO. 70 NATIONAL ELECTRICAL CODE, LATEST EDITION
- B. NFPA NO. 72 FIRE ALARM, LATEST EDITION
- C. IBC & UBC, LATEST EDITION
- D. LOCAL BUILDING CODES, LATEST EDITION
- 10. ALL EQUIPMENT AND MATERIALS SHALL BE NEW UNLESS NOTED OTHERWISE AND ACCEPTABLE FOR INSTALLATION ONLY IF LABELED OR LISTED AS DEFINED IN NFPA 70, ARTICLE 100, BY UL OR BY A RECOGNIZED TESTING LABORATORY WHERE STANDARDS HAVE BEEN ESTABLISHED AND ACCEPTABLE TO THE AUTHORITY HAVING JURISDICTION. LABELED OR LISTED EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH ANY INSTRUCTIONS OR LABELING PROVIDED WITH THE EQUIPMENT.
- 11. PROVIDE ALL CORE DRILLING, CHANNELING, CUTTING, PATCHING, SLEEVES, ETC. AS REQUIRED FOR INSTALLATION OF ELECTRICAL EQUIPMENT. SEAL HOLES, FIREPROOFING WHERE NECESSARY, AND REFINISH ALL REPAIR WORK TO ORIGINAL CONDITION WHERE DAMAGED BY ELECTRICAL WORK.
- 12. MAKE PROVISIONS FOR SAFE DELIVERY AND SECURE STORAGE OF ALL MATERIALS.
- 13. WARRANTIES: PROVIDE A WRITTEN WARRANTY TO THE OWNER COVERING THE ENTIRE ELECTRICAL WORK TO BE FREE FROM DEFECTIVE MATERIALS, EQUIPMENT AND WORKMANSHIP FOR A PERIOD OF ONE YEAR AFTER DATE OF ACCEPTANCE. ALL DEFECTIVE EQUIPMENT OR MATERIALS WHICH APPEAR DURING THE WARRANTY PERIOD SHALL BE REPLACED OR REPAIRED BY THE ELECTRICAL CONTRACTOR IN A TIMELY FASHION AT NO COST TO THE
- 14. PRODUCT ALTERATIONS AND SUBSTITUTIONS: SHOULD THE CONTRACTOR WISH TO HAVE PRODUCTS CONSIDERED OTHER THAN THOSE SPECIFIED, CONTRACTOR MUST SUBMIT THOSE ITEMS AS REQUIRED IN DIVISION 1.
- 15. SHOP DRAWINGS: SUBMIT SHOP DRAWINGS AS REQUIRED IN DIVISION 1 FOR ALL MATERIALS AND EQUIPMENT. IF THE SHOP DRAWINGS DEVIATE FROM THE CONTRACT DOCUMENTS ADVISE THE ENGINEER OF THE DEVIATIONS VIA WRITTEN FORMAT, ACCOMPANYING THE SHOP DRAWINGS. INCLUDE THE REASON FOR THE DEVIATION(S). COORDINATE ALL REQUIRED CHANGES WITH THE OTHER TRADES AFFECTED. IF THE CHANGES ARE OCCASIONED BY THE CONTRACTOR, THE CONTRACTOR SHALL PAY ANY COSTS INVOLVED. SHOP DRAWINGS SHALL INCLUDE BUT ARE NOT LIMITED TO THE FOLLOWING:
- A. PRODUCT DATA FOR WIRING DEVICES.
- B. PRODUCT DATA AND DRAWINGS FOR PANELBOARDS.C. PRODUCT DATA FOR LIGHTING FIXTURES.
- 16. PROJECT RECORD DRAWINGS: AT COMPLETION OF WORK, DELIVER COMPLETED PROJECT RECORD DOCUMENTS TO ARCHITECT. PROJECT RECORD DOCUMENTS SHALL INCLUDE "PROJECT RECORD" SHOP DRAWINGS.

SECTION 16060 - GROUNDING AND BONDING

- 1. CONDUIT SYSTEMS, SUPPORTS, CABINETS, EQUIPMENT, FIXTURES, THE GROUNDED CIRCUIT CONDUCTOR, ETC. SHALL BE PROPERLY GROUNDED IN ACCORDANCE WITH THE CURRENT ISSUE OF THE NATIONAL ELECTRICAL CODE. PROVIDE ALL BONDING JUMPERS AND WIRE, GROUNDING BUSHINGS, CLAMPS, ETC. AS REQUIRED FOR COMPLETE GROUNDING.
- A. CONNECTIONS SHALL BE EITHER BOLTED-PRESSURE-TYPE, COMPRESSION TYPE OR EXOTHERMIC-WELDED TYPE.
- 2. PROVIDE A SEPARATE EQUIPMENT GROUNDING CONDUCTOR IN ALL FEEDER AND BRANCH CIRCUITS AND ALL FLEXIBLE AND NONMETALLIC RACEWAYS.
- 3. GROUNDING CONDUCTOR MATERIAL: COPPER.

SECTION 16070 - HANGERS AND SUPPORTS

- 1. PROVIDE HANGERS AND SUPPORTS FOR EQUIPMENT, RACEWAYS AND CABLES, INCLUDING WEIGHT OF WIRE IN RACEWAYS.
- 2. USE HOT-DIPPED GALVANIZED MATERIAL OR NONMETALLIC, U-CHANNEL SYSTEMS FOR ALL DAMP AND OUTDOOR LOCATIONS.
- 3. STEEL MATERIAL SHALL BE USED FOR DRY LOCATIONS.

SECTION 16075 - ELECTRICAL IDENTIFICATION

- 1. PROVIDE LABELING FOR RACEWAYS AND CABLES.
- 2. PROVIDE UNDERGROUND LINE WARNING TAPE FOR ALL UNDERGROUND ELECTRICAL SERVICE (POWER, COMMUNICATIONS, ETC.) SYSTEM RACEWAYS.
- 3. PROVIDE ENGRAVED NAMEPLATES FOR ALL ELECTRICAL CABINETS, ENCLOSURES, PANELBOARDS. NAMEPLATES SHALL BE ENGRAVING STOCK, MELAMINE PLASTIC LAMINATE, MINIMUM 1/8 INCH THICK FOR SIGNS UP TO 20 SQ. IN AND 1/4 INCH THICK FOR LARGER SIZES WITH BLACK LETTERS ON A WHITE FACE OR AS REQUIRED BY CODE OR OWNER. INDICATE PANLEBOARD NAME, VOLTAGE AND PHASE.
- 4. COLOR CODING OF PHASE CONDUCTORS:
- A. CONDUCTORS NO. 8 AWG AND SMALLER SHALL BE FACTORY COLOR CODED. WIRE NO. 6 AWG AND LARGER MAY BE COLOR CODED BY FIELD PAINTING OR COLOR TAPING A 6—INCH LENGTH OF EXPOSED END.
- B. WRING FOR CONTROL SYSTEMS SHALL BE COLOR-CODED IN ACCORDANCE WITH THE WIRING DIAGRAMS FURNISHED WITH THE FOLLIPMENT

120/240 VOLTS
PHASE A: BLACK
PHASE B: RED
NUETRAL: WHITE
GROUND: GREEN

TRAVELERS:

SECTION 16080 - ELECTRICAL TESTING

PINK

1. PROVIDE TESTING OF ALL ELECTRICAL SYSTEMS AND COMPONENTS AS REQUIRED BY ALL APPLICABLE BUILDING CODES AND ORDINANCES, UL, NEMA, ANSI, ICEA, NECA, ETC., AND AS RECOMMENDED BY THE ELECTRICAL EQUIPMENT MANUFACTURERS.

SECTION 16120 - CONDUCTORS AND CABLES 600-V AND LESS

THHN-THWN, SINGLE CONDUCTORS IN RACEWAY.

- 1. MINIMUM SIZE NO. 12 EXCEPT FOR CONTROL OR SIGNAL CIRCUITS, WHICH MAY BE NO. 14 OR SMALLER. INCREASE CONDUCTOR SIZE AS NECESSARY TO LIMIT BRANCH CIRCUIT VOLTAGE DROP TO 3 PERCENT AND SERVICE/FEEDER VOLTAGE DROP TO 2 PERCENT.
- 2. ALL WIRING SHALL BE AS FOLLOWS:
- A. SERVICE ENTRANCE, EXPOSED FEEDERS, AND FEEDERS CONCEALED IN CEILINGS, WALLS AND PARTITIONS: TYPE THHN, THWN OR XHHW, SINGLE CONDUCTORS IN RACEWAY.
- B. FEEDERS CONCEALED IN CONCRETE AND BELOW SLABS-ON-GRADE: TYPE THHN-THWN, SINGLE CONDUCTORS IN RACEWAY.
- C. BRANCH CIRCUITS CONCEALED IN CEILINGS, WALLS, AND PARTITIONS, AND CONCEALED IN CONCRETE OR BELOW SLABS—ON—GRADE: TYPE
- D. ALL CONDUCTORS SHALL BE COPPER; SOLID CONDUCTOR FOR NO.12 AWG AND SMALLER, STRANDED FOR NO. 10 AWG AND LARGER, UNLESS NOTED OTHERWISE.
- 3. SPLICES FOR NO. 6 AWG AND SMALLER SHALL BE MADE WITH TWIST-ON WIRE CONNECTORS.
- 4. SPLICES FOR NO. 4 AWG AND LARGER SHALL BE MADE WITH SOLDERLESS OR COMPRESSION TYPE CU/ALR LUGS.
- 5. INSTALL CONDUCTOR AT EACH OUTLET, WITH AT LEAST 6 INCHES OF SLACK TO ALLOW FOR CONNECTION TO DEVICE.
- 6. TESTING: PERFORM THE FOLLOWING FIELD QUALITY-CONTROL TESTING:
- A. TORQUE TEST CONDUCTOR CONNECTIONS AND TERMINATIONS TO MANUFACTURER'S RECOMMENDED VALUES.
- B. PERFORM CONTINUITY TEST ON ALL POWER AND EQUIPMENT BRANCH CIRCUIT CONDUCTORS. VERIFY PROPER PHASING CONNECTIONS.
- C. INSULATION TEST: MEASURE THE INSULATION OF FEEDER CONDUCTORS. MEASUREMENTS SHALL BE TAKEN BETWEEN CONDUCTORS, AND CONDUCTORS AND GROUND. RESISTANCE SHALL BE 1,000,000 OHMS OR MORE WHEN TESTED AT 500 VOLTS BY MEGGER WITHOUT CIRCUIT LOADS.

SECTION 16130 - RACEWAYS

- 1. ALL CONDUCTORS SHALL BE ENCLOSED BY CONDUIT SIZED IN ACCORDANCE WITH CHAPTER 9, TABLE 4 OF THE NATIONAL ELECTRICAL CODE. MINIMUM SIZE 1/2 INCH. ALL CONDUITS SHALL BE CONCEALED IN FINISHED AREAS.
- 2. GALVANIZED RIGID METAL CONDUIT (RMC) AND INTERMEDIATE METAL CONDUIT (IMC) SHALL BE UTILIZED FOR ABOVE AND BELOW GRADE APPLICATIONS IN ACCORDANCE WITH ARTICLES 344 AND 342 OF THE NATIONAL ELECTRICAL CODE. ALL COUPLINGS SHALL BE THREADED.
- 3. ELECTRICAL METALLIC TUBING (EMT) SHALL BE UTILIZED FOR ALL DRY, ABOVE GRADE OR ABOVE FLOOR FEEDERS AND BRANCH CIRCUIT HOMERUN APPLICATIONS IN ACCORDANCE WITH ARTICLE 358 OF THE NATIONAL ELECTRICAL CODE. COUPLINGS SHALL BE STEEL SET SCREW TYPE.
- 4. FLEXIBLE METAL CONDUIT SHALL BE UTILIZED FOR ALL CONNECTIONS TO VIBRATING EQUIPMENT SUCH AS MOTORS (MINIMUM OF 2'-0", MAXIMUM OF 6'-0").
- 5. RIGID NONMETALLIC CONDUIT (PVC) SHALL BE UTILIZED FOR ABOVE AND BELOW GRADE APPLICATIONS IN ACCORDANCE WITH ARTICLE 352 OF THE NATIONAL ELECTRIC CODE. CONNECTIONS TO BE MADE BY THE USE OF A SUITABLE SOLVENT—TYPE CEMENT.
- 6. ALL CONDUITS EXPOSED OR CONCEALED SHALL BE ROUTED PARALLEL OR PERPENDICULAR WITH THE BUILDING WALLS. SUPPORT CONDUIT AS REQUIRED BY THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE.
- 7. PROVIDE EXPANSION TYPE FITTINGS FOR ALL CONDUITS, WHICH CROSS EXPANSION JOINTS.

SECTION 16137 - BOXES, ENCLOSURES AND CABINETS

- 1. OUTLET BOXES:
- A. FOUR INCH SQUARE OR OCTAGONAL, ZINC-COATED SHEET STEEL TYPE.
- B. ENCLOSURES EXPOSED TO WEATHER OR DAMP LOCATIONS SHALL BE WEATHERPROOF TYPE.
- 2. PROVIDE COVERS SET TO COME FLUSH WITH FINISHED WALLS.
- 3. PULL BOXES AND JUNCTION BOXES: JUNCTION BOXES AND PULL BOXES WILL BE PROVIDED AS REQUIRED. SIZE OF BOXES SHALL BE IN ACCORDANCE WITH THE CURRENT NATIONAL ELECTRICAL CODE REQUIREMENTS
- A. ENCLOSURES SHALL BE NEMA TYPE SUITABLE FOR THE SURROUNDING AREA AND CONDITIONS.

<u>SECTION 16140 — WIRING DEVICES</u>

- RECEPTACLES SHALL BE 20 AMP HUBBELL HBL5352 SERIES SPECIFICATION GRADE, OR ACCEPTABLE. GFI AND EXTERIOR RECEPTACLES SHALL BE HUBBELL GF5352 SERIES, OR ACCEPTABLE AND IF REQUIRED PROVIDE WP "IN USE" METAL TYPE COVER, OR ACCEPTABLE. PROVIDE DEVICE COLOR AS DIRECTED BY THE ARCHITECT.
- 2. AC QUIET OPERATING TYPE SWITCHES SHALL BE 120/277-V, 20 AMP HUBBELL 1221 SERIES, OR ACCEPTABLE. PROVIDE DEVICE COLOR AS DIRECTED BY THE ARCHITECT.
- 3. DEVICE PLATES SHALL BE HIGH ABUSIVE NYLON, COLOR TO MATCH DEVICE.
- 4. MOUNT DEVICES IN ACCORDANCE WITH THE FOLLOWING SCHEDULE EXCEPT WHERE OTHERWISE NOTED ON THE DRAWINGS OR IN AREAS WITH COUNTERS, BASEBOARD HEATERS OR IN AREAS OF BLOCK OR BRICK CONSTRUCTION:

CONVENIENCE RECEPTACLES: LONG AXIS VERTICAL AT 3'-6" AFF TO CENTER LATCH SIDE OF DOOR AT 4'-0" AFF TO

SECTION 16180 - EQUIPMENT WIRING SYSTEMS

- 1. PROVIDE BRANCH CIRCUITS TO EQUIPMENT PROVIDED BY OTHERS AND MAKE ALL CONNECTIONS.
- 2. PROVIDE SAFETY SWITCHES AND/OR THERMAL OVERLOAD SWITCHES AS REQUIRED.
- 3. HEATER UNITS IN ALL MOTOR STARTERS SHALL BE SIZED FOR APPROXIMATELY ONE HUNDRED FIFTEEN PERCENT (115%) OF FULL LOAD MOTOR CURRENT. CHECK AND COORDINATE ALL THERMAL PROTECTIVE DEVICES WITH THE EQUIPMENT THEY PROTECT.
- 4. PROVIDE FOR EACH MOTOR, ONE—HALF (1/2) HORSEPOWER AND BELOW, A HORSEPOWER RATED DISCONNECT SWITCH AND THERMAL OVERLOAD PROTECTION UNLESS INTERNALLY PROVIDED WITH THE MOTOR. THERMAL OVERLOAD SWITCHES FOR SINGLE PHASE MOTORS SHALL BE ALLEN—BRADLEY BULLETIN 600 OR ACCEPTABLE.
- 5. CAREFULLY COORDINATE ALL ELECTRICAL WORK WITH ALL OTHER APPLICABLE DIVISIONS.

SECTION 16442 - PANELBOARDS

- I. PROVIDE DEAD-FRONT, CIRCUIT BREAKER TYPE PANELS, SIZE, VOLTAGE, AMPERAGE AND NUMBER OF BRANCHES AS INDICATED ON THE DRAWINGS. BREAKERS SHALL BE THERMAL MAGNETIC TYPE (BOLTED) EMPLOYING QUICK-MAKE AND QUICK-BREAK MECHANISM FOR MANUAL OPERATION AS WELL AS AUTOMATIC OPERATION. AUTOMATIC TRIPPING SHALL BE INDICATED BY THE BREAKER HANDLE ASSUMING A DISTINCTIVE POSITION FROM THE MANUAL "ON" AND "OFF" MULTIPOLE BREAKERS SHALL HAVE A COMMON TRIP. TIE HANDLES WILL NOT BE PERMITTED.
- 2. ALL SPACES SHALL BE FULLY BUSSED.
- 3. PANELBOARDS SHALL HAVE A GROUNDING BUS FOR THE EQUIPMENT GROUNDING SYSTEM.
- 4. CIRCUIT BREAKERS SHALL HAVE A MINIMUM INTERRUPTING CAPACITY AS FOLLOWS, UNLESS OTHERWISE NOTED:

120/240 VOLTS: 10,000 AMPERES

- 5. PANELBOARDS SHALL BE A MINIMUM TWENTY INCHES (20") WIDE.
- 6. ALL BUSSING SHALL BE TIN-PLATED, HIGH STRENGTH, ELECTRICAL GRADE ALUMINUM ALLOY AND EXTEND ENTIRE LENGTH OF THE PANELBOARD.
- 7. PANELBOARDS SHALL BE PROVIDED WITH A HINGED LOCKABLE DOOR.
- 8. EACH PANELBOARD SHALL BE PROVIDED WITH A TYPED DIRECTORY CARD INSTALLED IN A TRANSPARENT PROTECTIVE COVER ON INSIDE OF DOOR PANEL.
- 9. ENCLOSURE: NEMA TYPE SUITABLE FOR THE SURROUNDING AREA AND CONDITIONS.
- 10. UPON COMPLETION OF INSTALLATION, INSPECT INTERIOR AND EXTERIOR OF PANELBOARDS. REMOVE PAINT SPLATTERS AND OTHER SPOTS, DIRT AND DEBRIS. VACUUM DIRT AND DEBRIS; DO NOT USE COMPRESSED AIR TO ASSIST CLEANING. TOUCH UP SCRATCHED AND MARRED FINISHES TO MATCH ORIGINAL FINISH.
- 11. PANELBOARDS SHALL BE AS MANUFACTURED BY EATON CORP.; CUTLER HAMMER, GENERAL ELECTRIC CO., SIEMENS ENERGY AND AUTOMATION, INC., OR SQUARE D. CO.

SECTIONS 16511 & 16521 - INTERIOR AND EXTERIOR LIGHTING

- 1. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY THE MANUFACTURERS SPECIFIED ON THE DRAWINGS OR PROVIDE PRODUCTS FROM MANUFACTURERS WITH SIMILAR CONSTRUCTION AND PHOTOMETRIC CHARACTERISTICS.
- 2. FLUORESCENT BALLASTS SHALL BE ELECTRONIC PROGRAMMED RAPID START TYPE WITH LESS THAN 10 PERCENT OF TOTAL HARMONIC DISTORTION, WITH INPUT POWER FACTOR ABOVE 97 PERCENT, AND PROVIDED WITH INTERNAL PROTECTION IN CASE OPERATING TEMPERATURES EXCEED A SAFE LEVEL OF OPERATION. FLUORESCENT BALLASTS SHALL BE AS MANUFACTURED BY ADVANCE, UNIVERSAL, LUTRON OR OSRAM/SYLVANIA.
- A. PROVIDE LOW TEMPERATURE BALLASTS MINUS 20 DEGREES F. FOR ALL UNHEATED OR EXTERIOR APPLICATIONS.
- 3. METAL HALIDE HIGH-INTENSITY-DISCHARGE BALLASTS SHALL BE CONSTANT WATTAGE AUTOTRANSFORMER OR REGULATING HIGH-POWER-FACTOR TYPE AS MANUFACTURED BY ADVANCE, UNIVERSAL, OSRAM/SYLVANIA OR VENTURE
- 4. LAMPS SHALL BE AS MANUFACTURED BY OSRAM/SYLVANIA, PHILLIPS, G.E. OR VENTURE.
- 5. COLOR TEMPERATURE FOR FLUORESCENT LAMPS SHALL BE AS SPECIFIED IN THE DRAWNGS.
- 9. SET LUMINAIRES LEVEL, PLUMB, AND SQUARE WITH CEILING AND WALLS, AND SECURE ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS AND APPROVED SUBMITTAL MATERIALS. INSTALL LAMPS IN EACH LUMINAIRE. DO NOT SUPPORT LUMINARIES TO THE WORK OF OTHER TRADES UNLESS OTHERWISE SPECIFIED OR NOTED. ALL LUMINAIRES SHALL BE INDEPENDENTLY SUPPORTED FROM STRUCTURE. PROVIDE ALL NECESSARY ADDITIONAL SUPPORTS AND HANGERS TO SECURELY FASTEN AND SUPPORT ALL LUMINAIRES TO STRUCTURE.
- 10. INSPECT EACH INSTALLED LUMINAIRE FOR DAMAGE. REPLACE DAMAGED LUMINAIRES AND COMPONENTS. VERIFY NORMAL OPERATION OF EACH LUMINAIRE AFTER INSTALLATION. INTERRUPT THE ELECTRICAL SUPPLY TO VERIFY PROPER OPERATION OF THE EMERGENCY LIGHTING. IF LUMINAIRES ARE MALFUNCTIONING, THEN REPAIR OR REPLACE COMPONENTS AND RETEST UNTIL LUMINAIRE OPERATES PROPERLY.
- 11. CLEAN LUMINAIRES INTERNALLY AND EXTERNALLY AFTER INSTALLATION PER MANUFACTURER'S RECOMMENDATIONS.
- 12. REPLACE ANY FAILED LAMPS IN EXISTING FIXTURES WITH MATCHING LAMP TYPE AND COLOR.

EET NO.